

THE PROPAGATION INFORMATION CENTER AT THE UNIVERSITY OF COLORADO

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Abstract--A Propagation Information Center is in the process of being established at the University of Colorado with connections to NApEX and to the NASA program at CU for Interdisciplinary Research in Telecommunications Policy and Technology Issues. The Propagation Information Center was conceived as a response to several items in the Science Review of the NASA Propagation Program carried out in September of 1986 by a distinguished panel of experts. E. K Smith joined W. L. Flock at the University of Colorado in July 1987. In preparation for the opening of the Information Center one or the other (or both) has attended six national or international meetings related to the work of the Center. The program for the Center is conceived as including archival aspects: a memory of past work by NApEX members; accounts of relevant research activities around the world; papers published in pertinent areas of propagation; and pertinent propagation data files. Duties of the Center should include: exchanging information as to future plans with research organizations around the world; scanning the literature for possible CCIR SG-5 contributions; carrying out quick response studies as requested by program management; conducting customer surveys of users of the NASA Propagation Programs products; preparing a quarterly newsletter to help maintain communication amongst program participants; and finally, assisting students and faculty at the University of Colorado working on policy issues for NASA with problems relating to propagation.

1. Introduction.

In September 1986, John Kiebler of the Communications and Information Division of NASA Headquarters (Code EC), conducted the first-ever formal program review of the NASA Propagation Program. He contracted with Science and Technology, Inc. to handle the arrangements and a panel of experts, namely Prof. Henry G. Booker, chairman, Dr. Gert Brussaard, Dr. K. S. McCormick, and Dr. David V. Rogers, was enlisted. Among their recommendations (Booker et al., 1987) were the following:

- The effectiveness of the program would be enhanced by cooperative projects with other organizations.
- There should be a mechanism for monitoring propagation research of other governmental and industrial organizations.
- The "acclaimed" Propagation Handbooks should be updated periodically, preferably in coordination with the 4-year CCIR cycle.
- The CCIR support activities should be maintained within the propagation program.

With these points in mind and, with the recognition that institutional memory is short, and hence an archiving function would be useful, the concept of a propagation information center began to take

shape (Flock, 1987a). The University of Colorado at Boulder has some built in advantages as a site for the Center. The winter URSI/IEEE National Radio Science Meeting is traditionally held at the University of Colorado. Boulder is the home of the Institute for Telecommunication Sciences, the NOAA Environmental Research Laboratories, the NBS Radio Standards Laboratory, and the National Center for Atmospheric Research, each of which has ties with the University of Colorado.

Office space was made available to Ernest Smith in July and an appointment as Professor Adjunct in the Electrical and Computer Engineering Department was made official in November. Warren Flock became Professor Emeritus in December, 1986 and he and Smith now share an office with space reserved across the hall for a secretary. They bring complementary talents to the job. Warren Flock has just completed the second edition of the Propagation Handbook for frequencies below 10 GHz (Flock, 1987b) and has organized and taught a course on Earth-space propagation at CU. Ernie Smith is more the outside man with broad experience with the CCIR, URSI, the IEEE, and foreign propagation laboratories.

2. Recent Activity.

While the final hurdle for the Propagation Information Center is not yet surmounted, still the outcome has seemed sufficiently assured that it was appropriate to start making preparations. Keeping up to date on worldwide propagation research has seemed to be especially good. Towards this end we have attended the following conferences:

- URSI General Assembly, Israel, August/September, 1987. Ernie Smith was a delegate and organized and chaired an invited session on Planetary Noise Environment (Smith 1987). He also served as secretary for the USNC Young Scientist Selection Committee.
- International Conference on Communications Technology, Nanjing, November, 1987 was attended by Warren Flock who presented an invited paper (Flock and Smith, 1987) on mobile satellite propagation.
- USNC/URSI National Radio Science Meeting, Boulder, January 1988 was attended by Ernie Smith. Both Ernie and Warren are members of the IEEE Wave Propagation Standards Committee which was meeting during the same period and Warren is currently chairman of the Mini-review subcommittee. Ernie had looked after the interests of URSI Commissions E and F for the Program Committee in his capacity of member-at-large of USNC/URSI.
- 1988 International Symposium on Radio Propagation (ISRP'88, Beijing, sponsored by URSI and Chinese Institute of Engineers, and co-sponsored by IEEE AP-S) April 18-21, 1988, was attended by Ernie as IEEE AP-S representative and member of the program committee. Ernie delivered a plenary address in English and Chinese and a technical paper (Smith and Flock, 1988). He also attended part of the URSI Beacon Satellite Symposium (IBSS'88) which was co-located with ISRP'88.
- Mobile Satellite Symposium, Pasadena, May 3-5, 1988, was attended by Warren, who delivered a paper (Flock and Smith, 1988).
- 1988 AP-S International Symposium and URSI Radio Science Meeting, Syracuse, June 6-10, was attended in part by Warren and Ernie.

Other preparations for the opening of the Propagation Information Center (CUPIC) include:

- Preparation of mailing lists for the Propagation Handbooks.
- Reviewing the Propagation Handbooks.
- Acquiring a Macintosh SE and LaserWriter.
- Acquiring answering machines on Ernie's lines (303) 492-7123 office, and (303) 530-3440 home.
- Improving ties with the Center for Space and Geosciences Policies (also supported by NASA Code EC) which has long had a propagation interest.

3. Program and Structure of the Propagation Information Center (CUPIC).

CUPIC is conceived of as an evolving entity which will provide a service to NAPEX participants and to NASA and JPL management. Current staffing is two-thirds of a man-year, covering Professors Smith and Flock, and a part-time secretary/programmer. Present plans include developing the the following services and archives as time permits:

- Serve as a memory for past work of NAPEX. CUPIC will maintain a master copy of each final report and paper produced under NAPEX and will contract with a local organization to reproduce copies upon request.
- Maintain indices of current propagation papers cross-referenced by subject, author, and year. Copies of current propagation papers will be maintained either in our periodical holdings (Radio Science, IEEE Proceedings, and AP-S and COM-Soc Transactions and journals) or reprint copies.
- Possibly maintain certain propagation data files (e.g. LMSS shadowed data samples, rain impaired data sample at 20 GHz) produced by the NAPEX participants.
- Exchange research products with other research organizations engaging in Earth-space propagation research in the US and abroad, and keep abreast of their current, and, if possible, future plans.
- Participate in the work of USPC/CCIR Study Groups 5 and 6, scan current literature for possible contributions to relevant areas of SG 5/6. Prepare submissions as appropriate.
- Undertake customer surveys of the recipients of NAPEX products.
- Prepare a newsletter about activities of NAPEX participants and about research in radio-wave propagation in general. Short articles will be solicited from NAPEX participants and cooperating organizations.
- Collaborate with the Center for Space and Geoscience Policy at the University of Colorado to develop information which may be helpful to NASA and JPL management in determining future directions for the NAPEX program.

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